

CHAPTER 1367

Comprehensive Storm Water Management

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CROSS REFERENCES

Sewerage System Regulations - see S.U. & P.S. Ch. [925](#)

1367.01 PURPOSE AND SCOPE.

(a) The purpose of this regulation is to establish technically feasible and economically reasonable stormwater management standards to achieve a level of stormwater quality and quantity control that will minimize damage to property and degradation of water resources and will promote and maintain the health, safety, and welfare of the citizens of the City of Willoughby Hills.

(b) This regulation requires owners who develop or re-develop their property within the City of Willoughby Hills to:

- (1) Control stormwater runoff from their property and ensure that all SCMs are properly designed, constructed, and maintained.
- (2) Reduce water quality impacts to receiving water resources that may be caused by new development or redevelopment activities.
- (3) Control the volume, rate, and quality of stormwater runoff originating from their property so that surface water and ground water are protected and flooding and erosion potential are not increased.
- (4) Minimize the need to construct, repair, and replace subsurface storm drain systems.
- (5) Preserve natural infiltration and ground water recharge, and maintain subsurface flow that replenishes water resources, except in slippage prone soils.
- (6) Incorporate stormwater quality and quantity controls into site planning and design at the earliest possible stage in the development process.
 - (7) Reduce the expense of remedial projects needed to address problems caused by inadequate stormwater management.
 - (8) Maximize use of SCMs that serve multiple purposes including, but not limited to, flood control, erosion control, fire protection, water quality protection, recreation, and habitat preservation.
- (9) Design sites to minimize the number of stream crossings and the width of associated disturbance in order to minimize the City of Willoughby Hills' future expenses related to the maintenance and repair of stream crossings.
- (10) Maintain, promote, and re-establish conditions necessary for naturally occurring stream processes that assimilate pollutants, attenuate flood flows, and provide a healthy water resource.

(c) This regulation shall apply to all parcels used or being developed, either wholly or partially, for new or relocated projects involving highways and roads; subdivisions or larger common plans of development; industrial, commercial, institutional, or residential projects; building activities on farms; redevelopment activities; grading; and all other uses that are not specifically exempted in Section [1367.01](#).

(d) Public entities, including the State of Ohio, Lake County, and the City of Willoughby Hills shall comply with this regulation for roadway projects initiated after March 10, 2006 and, to the maximum extent practicable, for projects initiated before that time.

(e) This regulation does not apply to activities regulated by, and in compliance with, the Ohio Agricultural Sediment Pollution Abatement Rules.

(f) This regulation does not require a Comprehensive Stormwater Management Plan for linear construction projects, such as pipeline or utility line installation, that do not result in the installation of impervious surface as determined by the City Engineer. Such projects must be designed to minimize the number of stream crossings and the width of disturbance. Linear construction projects must comply with the requirements of Chapter [1369](#) - Erosion and Sediment Control. (Ord. 2016-18. Passed 5-26-16.)

1367.02 DEFINITIONS.

For the purpose of this regulation, the following terms shall have the meaning herein indicated:

(a) ACRE: A measurement of area equaling 43,560 square feet.

(b) AS-BUILT SURVEY: A survey shown on a plan or drawing prepared by a registered Professional Surveyor indicating the actual dimensions, elevations, and locations of any structures, underground utilities, swales, detention facilities, and sewage treatment facilities after construction has been completed.

(c) BEST MANAGEMENT PRACTICES (BMP): Also STORMWATER CONTROL MEASURE (SCMs). Schedule of activities, prohibitions of practices, operation and maintenance procedures, treatment requirements, and other management practices (both structural and non-structural) to prevent or reduce the pollution of water resources and to control stormwater volume and rate. This includes practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. For guidance, please see U.S. EPA' National Menu of BMPs at <http://water.epa.gov/polwaste/npdes/swbmp/index.cfm>.

(d) CLEAN WATER ACT: Pub. L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, Pub. L. 97-117, and Pub. L. 100-4, 33 U.S.C. 1251 et. seq. Formally referred to as the Federal Water Pollution Control Act or the Federal Water Pollution Control Act Amendments of 1972.

(e) COMMUNITY: The City of Willoughby Hills, its designated representatives, boards, or commissions.

(f) COMPREHENSIVE STORM WATER MANAGEMENT PLAN: The written document and plans meeting the requirements of this regulation that sets forth the plans and practices to minimize stormwater runoff from a development area, to safely convey or temporarily store and release post-development runoff at an allowable rate to minimize flooding and stream bank erosion, and to protect or improve storm water quality and stream channels.

(g) CRITICAL STORM: A storm that is determined by calculating the percentage increase in volume of runoff by a proposed development area for the 1 year 24-hour event. The critical storm is used to calculate the maximum allowable stormwater discharge rate from a developed site.

(h) DEVELOPMENT AREA: A parcel or contiguous parcels owned by one person or persons, or operated as one development unit, and used or being developed for commercial, industrial, residential, institutional, or other construction or alteration that changes runoff characteristics.

(i) DEVELOPMENT DRAINAGE AREA: A combination of each hydraulically unique watershed with individual outlet points on the development area.

(j) DISTURBED AREA: An area of land subject to erosion due to the removal of vegetative cover and/or soil disturbing activities.

(k) DRAINAGE: The removal of excess surface water or groundwater from land by surface or subsurface drains.

(l) EROSION: The process by which the land surface is worn away by the action of wind, water, ice, gravity, or any combination of those forces.

(m) EXTENDED DETENTION FACILITY: A stormwater CONTROL MEASURE that replaces and/or enhances traditional detention facilities by releasing the runoff collected during the stormwater quality event over at least 24 to 48 hours, retarding flow and allowing pollutants to settle within the facility.

(n) **FINAL STABILIZATION:** All soil disturbing activities at the site have been completed and a uniform perennial vegetative cover with a density of at least 80% coverage for the area has been established or equivalent stabilization practices, such as the use of mulches or geotextiles, have been employed.

(o) **GRADING:** The process in which the topography of the surface of the land is altered to a new slope.

(p) **GREEN INFRASTRUCTURE:** Wet weather management approaches and technologies that utilize, enhance or mimic the natural hydrologic cycle processes of infiltration, evapotranspiration and reuse.

(q) **HYDROLOGIC UNIT CODE:** a cataloging system developed by the United States Geological Survey and the Natural Resource Conservation Service to identify watersheds in the United States.

(r) **IMPERVIOUS COVER:** Any surface that cannot effectively absorb or infiltrate water. This may include roads, streets, parking lots, rooftops, sidewalks, and other areas not covered by vegetation.

(s) **INFILTRATION CONTROL MEASURE:** A stormwater control measure that does not discharge to a water resource during the stormwater quality event, requiring collected runoff to either infiltrate into the groundwater and/or be consumed by evapotranspiration, thereby retaining stormwater pollutants in the facility.

(t) **LARGER COMMON PLAN OF DEVELOPMENT:** A contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.

(u) **LOW IMPACT DEVELOPMENT:** Low-impact development (LID) is a site design approach which seeks to integrate hydrologically functional design with pollution prevention measures to compensate for land development impacts on hydrology and water quality. LID's goal is to mimic natural hydrology and processes by using small-scale, decentralized practices that infiltrate, evaporate, detain, and transpire stormwater. LID stormwater control measures (SCMs) are uniformly and strategically located throughout the site.

(v) **MAXIMUM EXTENT PRACTICABLE:** The level of pollutant reduction that operators of small municipal separate storm sewer systems regulated under 40 C.F.R. Parts 9, 122, 123, and 124, referred to as NPDES Stormwater Phase II, must meet.

(w) **MUNICIPAL SEPARATE STORM SEWER SYSTEM MS4):** A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that are:

(1) Owned or operated by the federal government, state, municipality, township, county, district, or other public body (created by or pursuant to state or federal law) including a special district under state law such as a sewer district, flood control district or drainage districts, or similar entity, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into water resources; and

(2) Designed or used for collecting or conveying solely stormwater,

(3) Which is not a combined sewer, and

(4) Which is not a part of a publicly owned treatment works.

(x) **NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES):** A regulatory program in the Federal Clean Water Act that prohibits the discharge of pollutants into surface waters of the United States without a permit.

(y) **EDITOR'S NOTE:** This subsection is reserved for future legislation.)

(z) **EDITOR'S NOTE:** This subsection is reserved for future legislation.)

(aa) **NONSTRUCTURAL STORMWATER CONTROL MEASURE (SCM):** Any technique that uses natural processes and features to prevent or reduce the discharge of pollutants to water resources and control stormwater volume and rate.

(bb) **POST-DEVELOPMENT:** The conditions that exist following the completion of soil disturbing activity in terms of topography, vegetation, land use, and the rate, volume, quality, or direction of stormwater runoff.

(cc) **PRE-CONSTRUCTION MEETING:** Meeting prior to construction between all parties associated with the construction of the project including government agencies, contractors and owners to review agency requirements and plans as submitted and approved.

(dd) **PRE-DEVELOPMENT:** The conditions that exist prior to the initiation of soil disturbing activity in terms of topography, vegetation, land use, and the rate, volume, quality, or direction of stormwater runoff.

(ee) **PROFESSIONAL ENGINEER:** A Professional Engineer registered in the State of Ohio with specific education and experience in water resources engineering, acting in conformance with the Code of

Ethics of the Ohio State Board of Registration for Engineers and Surveyors.

(ff) REDEVELOPMENT: A construction project on land that has been previously developed and where the new land use will not increase the runoff coefficient used to calculate the water quality volume. If the new land use will increase the runoff coefficient, then the project is considered to be a new development project rather than a redevelopment project.

(gg) RIPARIAN AREA: Land adjacent to any brook, creek, river, or stream having a defined bed and bank that, if appropriately sized, helps to stabilize streambanks, limit erosion, reduces flood size flows, and/or filter and settle out runoff pollutants, or performs other functions consistent with the purposes of this regulation.

(hh) RIPARIAN AND WETLAND SETBACK: The real property adjacent to a water resource on which soil disturbing activities are limited, all as defined by the City of Willoughby Hills' Ordinance Chapter 1167 - Protected Area Regulations.

(ii) RUNOFF: The portion of rainfall, melted snow, or irrigation water that flows across the ground surface and is eventually returned to water resources.

(jj) SEDIMENT: The soils or other surface materials that can be transported or deposited by the action of wind, water, ice, or gravity as a product of erosion.

(kk) SEDIMENTATION: The deposition of sediment in water resources.

(ll) SITE OWNER/OPERATOR: Any individual, corporation, firm, trust, commission, board, public or private partnership, joint venture, agency, unincorporated association, municipal corporation, county or state agency, the federal government, other legal entity, or an agent thereof that is responsible for the overall construction site.

(mm) SOIL DISTURBING ACTIVITY: Clearing, grading, excavating, filling, or other alteration of the earth's surface where natural or human made ground cover is destroyed and that may result in, or contribute to, increased stormwater quantity and/or decreased stormwater quality.

(nn) STABILIZATION: The use of Best Management Practices or Stormwater Control Measures that reduce or prevent soil erosion by stormwater runoff, trench dewatering, wind, ice, gravity, or a combination thereof.

(oo) STORMWATER OR STORM WATER: Defined at 40 CFR 122.26(b)(13) and means stormwater runoff, snow melt runoff and surface runoff and drainage.

(pp) STORMWATER CONTROL MEASURE (SCM): Also Best Management Practice (BMP). Schedule of activities, prohibitions of practices, operation and maintenance procedures, treatment requirements, and other management practices (both structural and non-structural) to prevent or reduce the pollution of water resources and to control stormwater volume and rate. This includes practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. For guidance, please see U.S. EPA's National Menu of BMPs at <http://water.epa.gov/polwaste/npdes/swbmp/index.cfm>.

(qq) STRUCTURAL STORM WATER MANAGEMENT PRACTICE OR STORMWATER CONTROL MEASURE (SCM): Any constructed facility, structure, or device that prevents or reduces the discharge of pollutants to water resources and controls stormwater volume and rate.

(rr) SURFACE WATER OF THE STATE: Also Water Resource. Any stream, lake, reservoir, pond, march, wetland, or other waterway situated wholly or partly within the boundaries of the state, except those private waters which do not combine or affect a junction with surface water. Waters defined as sewerage systems, treatment works or disposal systems in Section 6111.01 of the Ohio Revised Code are not included.

(ss) TOTAL MAXIMUM DAILY LOAD: The sum of the existing and/or projected point source, nonpoint source, and background loads for a pollutant to a specified watershed, water body, or water body segment. A TMDL sets and allocates the maximum amount of a pollutant that may be introduced into the water and still ensure attainment and maintenance of water quality standards.

(tt) WATER QUALITY VOLUME: "Water Quality Volume (WQv)" means the volume of stormwater runoff which must be captured and treated prior to discharge from the developed site after construction is complete. WQv is based on the expected runoff generated by the mean storm precipitation volume from post-construction site conditions at which rapidly diminishing returns in the number of runoff events captured begins to occur.

(uu) WATER RESOURCE: Also SURFACE WATER. Any stream, lake, reservoir, pond, marsh, wetland, or waterway situated wholly or partly within the boundaries of the state, except those private waters

which do not combine or affect a junction with surface water. Waters defined as sewerage systems, treatment works or disposal systems in Section 6111.01 of the Ohio Revised Code are not included.

(vv) **WATER RESOURCE CROSSING:** Any bridge, box, arch, culvert, truss, or other type of structure intended to convey people, animals, vehicles, or materials from one side of a watercourse to another. This does not include private, non-commercial footbridges or pole mounted aerial electric or telecommunication lines, no does it include below grade utility lines.

(ww) **WATERSHED:** The total drainage area contributing stormwater runoff to a single point.

(xx) **WETLAND:** Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas (40 CFR 232, as amended). (Ord. 2016-18. Passed 5-26-16.)

1367.03 DISCLAIMER OF LIABILITY.

(a) Compliance with the provisions of this regulation shall not relieve any person from responsibility for damage to any person otherwise imposed by law. The provisions of this regulation are promulgated to promote the health, safety, and welfare of the public and are not designed for the benefit of any individual or any particular parcel of property.

(b) By approving a Comprehensive Stormwater Management Plan under this regulation, the City of Willoughby Hills does not accept responsibility for the design, installation, and operation and maintenance of SCMs. (Ord. 2016-18. Passed 5-26-16.)

1367.04 CONFLICTS, SEVERABILITY, NUISANCES AND RESPONSIBILITY.

(a) Where this regulation is in conflict with other provisions of law or ordinance, the most restrictive provisions, as determined by the City Engineer, shall prevail.

(b) If any clause, section, or provision of this regulation is declared invalid or unconstitutional by a court of competent jurisdiction, the validity of the remainder shall not be affected thereby.

(c) This regulation shall not be construed as authorizing any person to maintain a nuisance on their property, and compliance with the provisions of this regulation shall not be a defense in any action to abate such a nuisance.

(d) Failure of the City of Willoughby Hills to observe or recognize hazardous or unsightly conditions or to recommend corrective measures shall not relieve the site owner from the responsibility for the condition or damage resulting therefrom, and shall not result in the City of Willoughby Hills, its officers, employees, or agents being responsible for any condition or damage resulting therefrom. (Ord. 2016-18. Passed 5-26-16.)

1367.05 DEVELOPMENT OF COMPREHENSIVE STORM WATER MANAGEMENT PLANS.

(a) This regulation requires that a Comprehensive Stormwater Management Plan be developed and implemented for soil disturbing activities disturbing one (1) or more acres of total land, or less than one (1) acre if part of a larger common plan of development or sale disturbing one (1) or more acres of total land, and on which any regulated activity of Section [1367.01](#) (c) is proposed. A Comprehensive Stormwater Management Plan must be developed and implemented for all commercial and industrial site development. The City Engineer may require a comprehensive stormwater management plan on sites disturbing less than 1 acre.

(b) The City of Willoughby Hills shall administer this regulation, shall be responsible for determination of compliance with this regulation, and shall issue such notices and orders as may be necessary. The City of Willoughby Hills may consult with the Lake County Soil & Water Conservation District (SWCD), state agencies, private engineers, stormwater districts, or other technical experts as necessary in reviewing the Comprehensive Stormwater Management Plan. (Ord. 2016-18. Passed 5-26-16.)

1367.06 APPLICATION PROCEDURES.

(a) Pre-Application Meeting: The applicant shall attend a Pre-Application Meeting with the City Engineer to discuss the proposed project, review the requirements of this regulation, identify unique aspects of the project that must be addressed during the review process, and establish a preliminary review and approval schedule.

(b) Preliminary Comprehensive Storm Water Management Plan: The applicant shall submit two (2) sets of a Preliminary Comprehensive Stormwater Management Plan (Preliminary Plan) and the applicable fees to

the City Engineer. The Preliminary Plan shall show the proposed property boundaries, setbacks, dedicated open space, public roads, water resources, storm water control facilities, and easements in sufficient detail and engineering analysis to allow the City Engineer to determine if the site is laid out in a manner that meets the intent of this regulation and if the proposed SCMs are capable of controlling runoff from the site in compliance with this regulation. The applicant shall submit two (2) sets of the Preliminary Plan and applicable fees as follows:

(1) For subdivisions: In conjunction with the submission of the preliminary subdivision plan.

(2) For other construction projects: In conjunction with the application for a zoning permit.

(3) For general clearing projects: In conjunction with the application for a zoning permit.

(c) Final Comprehensive Stormwater Management Plan: The applicant shall submit two (2) sets of a Final Comprehensive Stormwater Management Plan (Final Plan) and the applicable fees to the City Engineer in conjunction with the submittal of the final plat, improvement plans, or application for a building or zoning permit for the site. The Final Plan shall meet the requirements of Section **1367.08** and shall be approved by the City Engineer prior to approval of the final plat and/or before issuance of a building and/or zoning permit by the Building & Zoning Inspector or the Lake County Building Department; whichever is applicable.

(d) Review and Comment: The City Engineer shall review the Preliminary and Final Plans submitted, and shall approve or return for revisions with comments and recommendations for revisions. A Preliminary or Final Plan rejected because of deficiencies shall receive a narrative report stating specific problems and the procedures for filing a revised Preliminary or Final Plan.

(e) Approval Necessary: Land clearing and soil-disturbing activities shall not begin and zoning and/or building permits shall not be issued without an approved Comprehensive Stormwater Management Plan. This regulation does not preclude reviews and approvals necessary by the Planning Commission as stipulated in the Codified Ordinances.

(f) Sublots Will Not Proceed: Comprehensive Stormwater Management Plans for individual sublots in a subdivision will not be approved and building permits will not be issued unless the larger common plan of development or sale containing the subplot is in compliance with this regulation.

(g) Valid for Two Years: Approvals issued in accordance with this regulation shall remain valid for two (2) years from the date of approval.

(Ord. 2016-18. Passed 5-26-16.)

1367.07 COMPLIANCE WITH STATE AND FEDERAL REGULATIONS.

Approvals issued in accordance with this regulation do not relieve the applicant of responsibility for obtaining all other necessary permits and/or approvals from other federal, state, and/or county agencies. If requirements vary, the most restrictive shall prevail. These permits may include, but are not limited to, those listed below. Applicants are required to show proof of compliance with these regulations before the City of Willoughby Hills will issue a building or zoning permit.

(a) Ohio Environmental Protection Agency (Ohio EPA) National Pollutant Discharge Elimination System (NPDES) Permits authorizing stormwater discharges associated with construction activity or the most current version thereof: Proof of compliance with these requirements shall be the applicant's Notice of Intent (NOI) number from Ohio EPA, a copy of the Ohio EPA Director's Authorization Letter for the NPDES Permit, or a letter from the site owner certifying and explaining why the NPDES Permit is not applicable.

(b) Section 401 of the Clean Water Act: Proof of compliance shall be a copy of the Ohio EPA Water Quality Certification application tracking number, public notice, project approval, or a letter from the site owner certifying that a qualified professional has surveyed the site and determined that Section 401 of the Clean Water Act is not applicable. Wetlands, and other waters of the United States, shall be delineated by protocols accepted by the U.S. Army Corps of Engineers at the time of application of this regulation.

(c) Ohio EPA Isolated Wetland Permit: Proof of compliance shall be a copy of Ohio EPA's Isolated Wetland Permit application tracking number, public notice, project approval, or a letter from the site owner certifying that a qualified professional has surveyed the site and determined that Ohio EPA's Isolated Wetlands Permit is not applicable. Isolated wetlands shall be delineated by protocols accepted by the U.S. Army Corps of Engineers at the time of application of this regulation.

(d) Section 404 of the Clean Water Act: Proof of compliance shall be a copy of the U.S. Army Corps of Engineers Individual Permit application, public notice, or project approval, if an Individual Permit is required for the development project. If an Individual Permit is not required, the site owner shall submit

proof of compliance with the U.S. Army Corps of Engineer's Nationwide Permit Program. This shall include one of the following:

- (1) A letter from the site owner certifying that a qualified professional has surveyed the site and determined that Section 404 of the Clean Water Act is not applicable.
- (2) A site plan showing that any proposed fill of waters of the United States conforms to the general and special conditions specified in the applicable Nationwide Permit. Wetlands, and other waters of the United States, shall be delineated by protocols accepted by the U.S. Army Corps of Engineers at the time of application of this regulation.
- (e) Ohio Dam Safety Law: Proof of compliance shall be a copy of the ODNR Division of Soil and Water Resources permit application tracking number, a copy of the project approval letter from the ODNR Division of Soil and Water Resources, or a letter from the site owner certifying and explaining why the Ohio Dam Safety Law is not applicable. (Ord. 2016-18. Passed 5-26-16.)

1367.08 COMPREHENSIVE STORM WATER MANAGEMENT PLANS.

(a) Comprehensive Stormwater Management Plan Required: The applicant shall develop a Comprehensive Stormwater Management Plan describing how the quantity and quality of stormwater will be managed after construction is completed for every discharge from the site and/or into a water resource or small municipal separate storm sewer system (MS4). The Plan will illustrate the type, location, and dimensions of every structural and non-structural SCM incorporated into the site design, and the rationale for their selection. The rationale must address how these SCMs will address flooding within the site as well as flooding that may be caused by the development upstream and downstream of the site. The rationale will also describe how the SCMs minimize impacts to the physical, chemical, and biological characteristics of on-site and downstream water resources and, if necessary, correct current degradation of water resources that is occurring or take measures to prevent predictable degradation of water resources.

(b) Preparation by Professional Engineer: The Comprehensive Stormwater Management Plan shall be prepared by a registered Professional Engineer and include supporting calculations, plan sheets, and design details. To the extent necessary, as determined by the City Engineer, a site survey shall be performed by a registered Professional Surveyor to establish boundary lines, measurements, or land surfaces.

(c) Community Procedures: The City Engineer shall prepare and maintain procedures providing specific criteria and guidance to be followed when designing the stormwater management system for the site. These procedures may be updated from time to time, at the discretion of the City Engineer based on improvements in engineering, science, monitoring, and local maintenance experience. The City Engineer shall make the final determination of whether the practices proposed in the Comprehensive Stormwater Management Plan meet the requirements of this regulation. The City Engineer may also maintain a list of acceptable SCMs that meet the criteria of this regulation to be used in the City of Willoughby Hills.

(d) Contents of Comprehensive Storm Water Management Plan: The Comprehensive Stormwater Management Plan shall contain an application, narrative report, construction site plan sheets, a long-term Inspection and Maintenance Plan, and Inspection and Maintenance Agreement and a site description with the following information provided:

- (1) Site description:
 - A. A description of the nature and type of the construction activity (e.g. residential, shopping mall, highway, etc.).
 - B. Total area of the site and the area of the site that is expected to be disturbed (i.e. grubbing, clearing, excavation, filling or grading, including off-site borrow areas).
 - C. A description of prior land uses at the site.
 - D. An estimate of the impervious area and percent imperviousness created by the soil-disturbing activity at the beginning and at the conclusion of the project.
 - E. Selection (source and justification) and/or calculations of runoff coefficients for water quality volume determination, peak discharge control (curve number/critical storm method), and rational method.
 - F. Existing data describing the soils throughout the site including soil map units including series, complexes, and association hydrologic soil group, porosity, infiltration characteristics, depth to groundwater, depth to bedrock, and any impermeable layers.
 - G. If available, the quality of any known pollutant discharge from the site such as that which may result from previous contamination caused by prior land uses.

H. The location and name of the immediate water resource(s) and the first subsequent water resource(s).

I. The aerial (plan view) extent and description of water resources at or near the site that will be disturbed or will receive discharges from the project.

J. If applicable, identify the point of discharge to a municipal separate storm sewer system and the location where that municipal separate storm sewer system ultimately discharges to a stream, lake, or wetland. The location and name of the immediate receiving stream or surface water(s) and the first subsequent receiving water(s) and the aerial extent and description of wetlands or other special aquatic sites at or near the site which will be disturbed or which will receive discharges from undisturbed areas of the project.

K. TMDLs applicable for the site [refer to TMDL community identifier table at <http://www.neohiostormwater.com/>]; demonstrate that appropriate (SCMs) have been selected to address these TMDLs.

L. For each SCM, identify the drainage area, percent impervious cover within the drainage area, runoff coefficient for water quality volume, peak discharge, and the time of concentration for each subwatershed per Appendix 1 of Ohio's stormwater manual, Rainwater and Land Development. Pervious and impervious areas should be treated as separate subwatersheds unless allowed at the discretion of the community engineer. Identify the SCM surface area, discharge and dewatering time, outlet type and dimensions. Each SCM shall be designated with an individual identification number.

M. Describe the current condition of water resources including the vertical stability of stream channels and indications of channel incision that may be responsible for current or future sources of high sediment loading or loss of channel stability.

(2) Site map showing:

A. Limits of soil-disturbing activity on the site.

B. Soils map units for the entire site, including locations of unstable or highly erodible soils.

C. Existing and proposed one-foot (1') contours. This must include a delineation of drainage watersheds expected before, during, and after major grading activities as well as the size of each drainage watershed in acres.

D. Water resource locations including springs, wetlands, streams, lakes, water wells, and associated setbacks on or within 200 feet of the site, including the boundaries of wetlands or streams and first subsequent named receiving water(s) the applicant intends to fill or relocate for which the applicant is seeking approval from the Army Corps of Engineers and/or Ohio EPA.

E. Existing and planned locations of buildings, roads, parking facilities, and utilities.

F. The location of any in-stream activities including stream crossings.

(3) Contact information: Company name and contact information as well as contact name, addresses, and phone numbers for the following:

A. The Professional Engineer who prepared the Comprehensive Stormwater Management Plan.

B. The site owner.

(4) Phase, if applicable, of the overall development plan.

(5) List of subplot numbers, if project is a subdivision.

(6) Ohio EPA NPDES Permit Number and other applicable state and federal permit numbers, if available, or status of various permitting requirements if final approvals have not been received.

(7) Location, including complete site address and subplot number if applicable.

(8) Location of any easements or other restrictions placed on the use of the property.

(9) A site plan sheet showing:

A. The location of each proposed post-construction SCMs.

B. The geographic coordinates of the site AND each proposed practice in North American Datum Ohio State Plane North.

It is preferred that the entire site be shown on one plan sheet to allow a complete view of the site during plan review. If a smaller scale is used to accomplish this, separate sheets providing an enlarged view of areas on individual sheets should also be provided.

(10) An Inspection and Maintenance Agreement. The Inspection and Maintenance Agreement required for SCMs under this regulation as a stand-alone document between the City of Willoughby Hills and

applicant. A copy of this agreement should be attached to the property deed. The agreement shall contain the following information and provisions:

A. Identification of the landowner(s), organization, or municipality responsible for long-term inspection and maintenance, including repairs, of the SCMs.

B. The landowner(s), organization, or municipality shall maintain SCMs in accordance with the regulation.

C. The City of Willoughby Hills has the authority to enter upon the property to conduct inspections as necessary, with prior notification of the property owner, to verify that the SCMs are being maintained and operated in accordance with this regulation.

D. The City of Willoughby Hills shall maintain public records of the results of site inspections, shall inform the landowner(s), organization, or municipality responsible for maintenance of the inspection results, and shall specifically indicate in writing any corrective actions required to bring the SCMs into proper working condition.

E. If the City of Willoughby Hills notifies the landowner(s), organization, or municipality responsible for maintenance of the maintenance problems that require correction, the specific corrective actions shall be taken within a reasonable time as determined by the City of Willoughby Hills.

F. The City of Willoughby Hills is authorized to enter upon the property and perform the corrective actions identified in the inspection report if the landowner(s), organization, or municipality responsible for maintenance does not make the required corrections in the specified time period. The City of Willoughby Hills shall be reimbursed by the landowner(s), organization, or municipality responsible for maintenance for all expenses incurred within 10 days of receipt of invoice from the City of Willoughby Hills, or more with written approval from the City Engineer.

G. The method of funding long-term maintenance and inspections of all SCMs.

H. A release of the City of Willoughby Hills from all damages, accidents, casualties, occurrences, or claims that might arise or be asserted against the City of Willoughby Hills from the construction, presence, existence, or maintenance of the SCMs.

(11) Inspection and Maintenance Plan. This plan will be developed by the applicant and reviewed by the City of Willoughby Hills. Once the Inspection and Maintenance Plan is approved, a recorded copy of the Plan must be submitted to the City as part of the final inspection approval as described in [1367.12](#). The plan will include at a minimum:

A. The location of each SCM and identification of the drainage area served by each SCM.

B. Photographs of each SCM, including all inlets and outlets upon completion of construction.

C. Schedule of inspection.

D. A schedule for regular maintenance for each aspect of the stormwater management system and description of routine and non-routine maintenance tasks to ensure continued performance of the system as is detailed in the approved Comprehensive Stormwater Management Plan. A maintenance inspection checklist written so the average person can understand it shall be incorporated. The maintenance plan will include a detailed drawing of each SCM and outlet structures with the parts of the outlet structure labeled. This schedule may include additional standards, as required by the City Engineer, to ensure continued performance of SCMs permitted to be located in, or within 50 feet of, water resources.

E. The location and documentation of all access and maintenance easements on the property.

Alteration or termination of these stipulations is prohibited.

(12) Required Calculations: The applicant shall submit calculations for projected stormwater runoff flows, volumes, and timing into and through all SCMs, for flood control, channel protection, water quality and the condition of the habitat, stability, and incision of each water resource and its floodplain, as required in Section [1367.09](#) of this regulation. These submittals shall be completed for both pre- and post-development land use conditions and shall include the underlying assumptions and hydrologic and hydraulic methods and parameters used for these calculations. The applicant shall also include critical storm determination and demonstrate that the runoff from offsite areas have been considered in the calculations.

(13) List of all contractors and subcontractors before construction: Prior to construction or before the pre-construction meeting, provide the list of all contractors and subcontractors and their names, addresses, and phones involved with the implementation of the Comprehensive Stormwater Management Plan including a written document containing signatures of all parties as proof of acknowledgment that they have

reviewed and understand the requirements and responsibilities of the Comprehensive Stormwater Management Plan.

(14) Existing and proposed drainage patterns: The location and description of existing and proposed drainage patterns and SCMs, including any related SCMs beyond the development area and the larger common development area.

(15) For each SCM to be employed on the development area, include the following:

A. Location and size, including detail drawings, maintenance requirements during and after construction, and design calculations, all where applicable.

B. Final site conditions including stormwater inlets and permanent nonstructural and structural SCMs. Details of SCMs shall be drawn to scale and shall show volumes and sizes of contributing drainage areas.

C. Any other structural and/or non-structural SCMs necessary to meet the design criteria in this regulation and any supplemental information requested by the City Engineer.

D. Each SCM shall be designated with an individual identification number. (Ord. 2016-18. Passed 5-26-16.)

1367.09 PERFORMANCE STANDARDS.

(a) General: The stormwater system, including SCMs for storage, treatment and control, and conveyance facilities, shall be designed to prevent structure flooding during the 100-year, 24-hour storm event; to maintain predevelopment runoff patterns, flows, and volumes; and to meet the following criteria:

(1) Integrated practices that minimize degradation of water resources. The SCMs shall function as an integrated system that controls flooding and minimizes the degradation of the physical, biological, and chemical integrity of the water resources receiving stormwater discharges from the site. Acceptable practices shall:

A. Not disturb riparian areas, unless the disturbance is intended to support a watercourse restoration project and comply with Chapter [1167](#) (Protected Area Regulations).

B. Maintain predevelopment hydrology and groundwater recharge on as much of the site as practicable.

C. Only install new impervious surfaces and compact soils where necessary to support the future land use.

D. Compensate for increased runoff volumes caused by new impervious surfaces and soil compaction by reducing stormwater peak flows to less than predevelopment levels.

E. Be designed according to the methodology included in the most current edition of Rainwater and Land Development or another design manual acceptable for use by the City of Willoughby Hills and Ohio EPA.

SCMs that meet the criteria in this regulation, and additional criteria required by the City Engineer, shall comply with this regulation.

(2) Practices designed for final use: SCMs shall be designed to achieve the stormwater management objectives of this regulation, to be compatible with the proposed post-construction use of the site, to protect the public health, safety, and welfare, and to function safely with routine maintenance.

(3) Storm water management for all lots: Areas developed for a subdivision, as defined in Title 5 - Subdivision Regulations, shall provide stormwater management and water quality controls for the development of all subdivided lots. This shall include provisions for lot grading and drainage that prevent structure flooding during the 100-year, 24-hour storm; and maintain, to the extent practicable, the pre-development runoff patterns, volumes, and peaks from each lot.

(4) Storm water facilities in water resources: SCMs and related activities shall not be constructed in water resources unless the applicant shows proof of compliance with all appropriate permits from the Ohio EPA, the U.S. Army Corps, and other applicable federal, state, and local agencies, as required in Section [1367.07](#) of this regulation, and the activity is in compliance with Chapter [1369](#) Erosion and Sediment Control requirements) and Chapter [1167](#) (Protected Area Regulations), all as determined by the City Engineer.

(5) Storm water ponds and surface conveyance channels: All stormwater pond and surface conveyance designs must provide a minimum of one (1) foot freeboard above the projected peak stage within the facility during the 100-year, 24-hour storm. When designing stormwater ponds and conveyance channels, the

applicant shall consider public safety as a design factor and alternative designs must be implemented where site limitations would preclude a safe design.

(6) Exemption: The site where soil-disturbing activities are conducted shall be exempt from the requirements of Section [1367.09](#) if it can be shown to the satisfaction of the City Engineer that the site is part of a larger common plan of development where the stormwater management requirements for the site are provided by an existing SCMs, or if the stormwater management requirements for the site are provided by practices defined in a regional or local stormwater management plan approved by the City Engineer.

(7) Maintenance: All SCMs shall be maintained in accordance with the Inspection and Maintenance Plan and Agreements approved by the City Engineer as detailed in Section [1367.08](#).

(8) Ownership: Unless otherwise required by the City of Willoughby Hills, SCMs serving multiple lots in subdivisions shall be on a separate lot held and maintained by an entity an entity of common ownership or, if compensated by the property owners, by the City of Willoughby Hills. SCMs serving single lots shall be placed on these lots, protected within an easement, and maintained by the property owner.

(9) Preservation of Existing Natural Drainage: Practices that preserve and/or improve the existing natural drainage shall be used to the maximum extent practicable. Such practices may include minimizing site grading and compaction; protecting and/or restoring water resources, riparian areas, and existing vegetation; and vegetative buffer strips; phasing of construction operations in order to minimize the amount of disturbed land at any one time, and designation of tree preservation areas or other protective clearing and grubbing practices; maintaining unconcentrated stormwater runoff to and through these areas. Post-construction stormwater practices shall provide perpetual management of runoff quality and quantity so that a receiving stream's physical, chemical and biological characteristics are protected and ecological functions are maintained.

(10) Preservation of Wetland Hydrology: Concentrated stormwater runoff from SCMs to wetlands shall be converted to diffuse flow before the runoff enters the wetlands in order to protect the natural hydrology, hydroperiod, and wetland flora. The flow shall be released such that no erosion occurs down slope. Practices such as level spreaders, vegetative buffers, infiltration basins, conservation of forest covers, and the preservation of intermittent streams, depressions, and drainage corridors may be used to maintain the wetland hydrology.

If the applicant proposes to discharge to natural wetlands, a hydrological analysis shall be performed to demonstrate that the proposed discharge matches the pre-development hydroperiods and hydrodynamics that support the wetland.

(11) Soil Preservation and Post-Construction Soil Restoration: To the maximum extent practicable leave native soil undisturbed and protect from compaction during construction. Except for areas that will be covered by impervious surface or have been incorporated into an SCM, the soil moisture-holding capacity of areas that have been cleared and graded must be restored to that of the original, undisturbed soil to the maximum extent practicable. Areas that have been compacted or had the topsoil or duff layer removed should be amended using the following steps: 1. Till subsoil to a depth of 15-18 inches, 2. Incorporate compost through top 12 inches, 3. Replace with stockpiled site or imported suitable topsoil to a minimum depth of 4 inches.

(b) Storm Water Conveyance Design Criteria: All SCMs shall be designed to convey stormwater to allow for the maximum removal of pollutants and reduction in flow velocities. This shall include but not be limited to:

(1) Surface water protection: The City Engineer may allow modification to streams, rivers, lakes, wetlands or other surface waters only if the applicant shows proof of compliance with all appropriate permits from the Ohio EPA, the U.S. Army Corps, and other applicable federal, state, and local agencies as required in Section [1367.07](#) of this regulation, and the activity is in compliance with Chapter [1369](#) - Erosion and Sediment Control Requirements and Chapter [1167](#) (Protected Area Regulations), all as determined by the City Engineer. At a minimum, stream relocation designs must show how the project will minimize changes to the vertical stability, floodplain form, channel form, and habitat of upstream and downstream channels on and off the property.

(2) Off-site storm water discharges: Off-site stormwater runoff that discharges to or across the applicant's development site shall be conveyed through the stormwater conveyance system planned for the development site at its existing peak flow rates during each design storm. Off-site flows shall be diverted around stormwater quality control facilities or, if this is not possible, the stormwater quality control facility

shall be sized to treat the off-site flow. Comprehensive Stormwater Management Plans will not be approved until it is demonstrated to the satisfaction of the City Engineer that off-site runoff will be adequately conveyed through the development site in a manner that does not exacerbate upstream or downstream flooding and erosion.

(3) Sheet flow. The site shall be graded in a manner that maintains sheet flow over as large an area as possible. The maximum area of sheet flow shall be determined based on the slope, the uniformity of site grading, and the use of easements or other legally-binding mechanisms that prohibit re-grading and/or the placement of structures within sheet flow areas. In no case shall the sheet flow length be longer than 300 feet, nor shall a sheet flow area exceed 1.5 acres. Flow shall be directed into an open channel, storm sewer, or other SCMs from areas too long and/or too large to maintain sheet flow, all as determined by the City Engineer.

(4) Open channels: Unless otherwise allowed by the City Engineer, drainage tributary to SCMs shall be provided by an open channel with vegetated banks and designed to carry the 10 year, 24 hour stormwater runoff from upstream contributory areas.

(5) Open drainage systems: Open drainage systems shall be preferred on all new development sites to convey stormwater where feasible. Storm sewer systems shall be allowed only when the site cannot be developed at densities allowed under the City of Willoughby Hills' zoning or where the use of an open drainage system affects public health or safety, all as determined by the City Engineer. The following criteria shall be used to design storm sewer systems when necessary:

A. Storm sewer capacity and hydraulic grade line shall be designed in accordance with the current version of UNIFORM STANDARDS FOR SEWERAGE IMPROVEMENTS unless otherwise approved by the City Engineer.

B. The minimum inside diameter of pipe to be used in public storm sewer systems is 12 inches. Smaller pipe sizes may be used in private systems, subject to the approval of the City Engineer.

C. All storm sewer systems shall be designed taking into consideration the tailwater of the receiving facility or water resource. The tail water elevation used shall be based on the design storm frequency. The hydraulic grade line for the storm sewer system shall be computed with consideration for the energy losses associated with entrance into and exit from the system, friction through the system, and turbulence in the individual manholes, catch basins, and junctions within the system.

D. The inverts of all curb inlets, manholes, yard inlets, and other structures shall be formed and channelized to minimize the incidence of quiescent standing water where mosquitoes may breed.

E. Headwalls shall be required at all storm sewer inlets or outlets to and from open channels or lakes.

(6) Water Resource Crossings. The following criteria shall be used to design structures that cross a water resource within the City of Willoughby Hills:

A. Water resource crossings other than bridges shall be designed to convey the stream's flow for the minimum 25 year, 24 hour storm.

B. Bridges, open bottom arch or spans are the preferred crossing technique and shall be considered in the planning phase of the development. Bridges and open spans should be considered for all State Scenic Rivers, coldwater habitat, exceptional warmwater habitat, seasonal salmonid habitat streams, and Class III headwater streams. The footers or piers for these bridges and open spans shall not be constructed below the ordinary high water mark.

C. If a culvert or other closed bottom crossing is used, twenty-five (25) percent of the cross-sectional area or a minimum of 1 foot of box culverts and pipe arches must be embedded below the channel bed. The conduit or conveyance must be sized to carry the 25-year storm under these conditions.

D. The minimum inside diameter of pipes to be used for crossings shall be 12 inches.

E. The maximum slope allowable shall be a slope that produces a 10 fps velocity within the culvert barrel under design flow conditions. Erosion protection and/or energy dissipaters shall be required to properly control entrance and outlet velocities.

F. All culvert installations shall be designed with consideration for the tailwater of the receiving facility or water resource. The tailwater elevation used shall be based on the design storm frequency.

G. Headwalls shall be required at all culvert inlets or outlets to and from open channels or lakes.

H. Streams with a drainage area of 5 square miles or larger shall incorporate floodplain culverts at the bankfull elevation to restrict head loss differences across the crossing so as to cause no rise in the 100-year storm event.

I. Bridges shall be designed such that the hydraulic profile through a bridge shall be below the bottom chord of the bridge for either the 100 year, 24 hour storm, or the 100 year flood elevation as determined by FEMA, whichever is more restrictive.

(7) Overland flooding: Overland flood routing paths shall be used to convey stormwater runoff from the 100 year, 24 hour storm event to an adequate receiving water resource or SCM such that the runoff is contained within the drainage easement for the flood routing path and does not cause flooding of buildings or related structures. The peak 100-year water surface elevation along flood routing paths shall be at least one foot below the finished grade elevation of all structures. When designing the flood routing paths, the conveyance capacity of the site's storm sewers shall be taken into consideration.

(8) Compensatory flood storage mitigation: In order to preserve floodplain storage volumes and thereby avoid increases in water surface elevations, any filling within 100-year floodplains approved by the City of Willoughby Hills must be compensated by providing an equivalent volume. First consideration for the location(s) of compensatory floodplain volumes should be given to areas where the stream channel will have immediate access to the new floodplain within the limits of the development site. Consideration will also be given to enlarging existing or proposed retention basins to compensate for floodplain fill if justified by a hydraulic analysis of the contributing watershed. Unless otherwise permitted by the City of Willoughby Hills, reductions in volume due to floodplain fills must be mitigated within the legal boundaries of the development. Embankment slopes used in compensatory storage areas must reasonably conform to the natural slopes adjacent to the disturbed area. The use of vertical retaining structures is specifically prohibited.

(9) Velocity dissipation: Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide non-erosive flow velocity from the structure to a water resource so that the natural physical and biological characteristics and functions of the water resource are maintained and protected.

(c) Storm Water Quality Control:

(1) Direct runoff to a SCM: The site shall be designed to direct runoff to one or more of the following SCMs chosen. These practices are listed in Table 2 of this regulation and shall be designed to meet the following general performance standards:

A. Extended detention facilities that detain stormwater; settle or filter particulate pollutants; and release the controlled stormwater to a water resource.

B. Infiltration facilities that retain stormwater; promote settling, filtering, and biodegradation of pollutants; and infiltrate captured stormwater into the ground. The City Engineer may require a soil engineering report to be prepared for the site to demonstrate that any proposed infiltration facilities meet these performance standards.

For sites less than five (5) acres, but required to create a comprehensive stormwater management plan, the City Engineer may approve other SCMs if the applicant demonstrates to the City Engineer's satisfaction that these SCMs meet the objectives of this regulation as stated in Section [1367.09.C.6](#).

C. For sites greater than five (5) acres, or less than five (5) acres but part of a larger common plan of development or sale which will disturb five (5) or more acres, the City Engineer may approve other SCMs if the applicant demonstrates to the City Engineer's satisfaction that these SCMs meet the objectives of this regulation as stated in Section [1367.09.C.6](#), and has prior written approval from the Ohio EPA.

D. For the construction of new roads and roadway improvement projects by public entities (i.e. the state, counties, townships, cities, or villages), the City Engineer may approve SCMs not included in Table 2 of this regulation, but must show compliance with the current version of the Ohio Department of Transportation "Location and Design Manual, Volume Two Drainage Design".

(2) Criteria applying to all SCMs. Practices chosen must be sized to treat the water quality volume (WQv) and to ensure compliance with Ohio Water Quality Standards (OAC Chapter 3745-1).

A. The WQv shall be equal to the volume of runoff from a 0.75-inch rainfall event and shall be determined according to one of the following methods:

1. Through a site hydrologic study approved by the City Engineer that uses continuous hydrologic simulation; site-specific hydrologic parameters, including impervious area, soil infiltration characteristics, slope, and surface routing characteristics; proposed SCMs controlling the amount and/or timing of runoff from the site; and local long-term hourly records, or

2. Using the following equation:

$$WQV = C * P * A / 12$$

where terms have the following meanings:

WQV = water quality volume in acre-feet

C = runoff coefficient appropriate for storms less than 1 in.

P = 0.75-inch precipitation depth

A = area draining into the storm water practice, in acres.

Runoff coefficients required by the Ohio Environmental Protection Agency (Ohio EPA) for use in determining the WQv can be determined using the list in Table 1 or using the following equation to calculate the runoff coefficient:

$$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$$

where: i = fraction of the drainage area that is impervious

Table 1: Runoff Coefficients Based on the Type of Land Use

Land Use	Runoff Coefficient
Industrial & Commercial	0.8
High Density Residential (> 8 dwellings/acre)	0.5
Medium Density Residential (4 to 8 dwellings/acre)	0.4
Low Density Residential (< 4 dwellings/acre)	0.3
Open Space and Recreational Areas	0.2
Where land use will be mixed, the runoff coefficient should be calculated using a weighted average. For example, if 60% of the contributing drainage area to the storm water treatment structure is Low Density Residential, 30% is High Density Residential, and 10% is Open Space, the runoff coefficient is calculated as follows $(0.6)(0.3) + (0.3)(0.5) + (0.1)(0.2) = (0.35)$	

B. An additional volume equal to 20% of the WQv shall be incorporated into the stormwater practice for sediment storage. This volume shall be incorporated into the sections of stormwater practices where pollutants will accumulate.

C. Each individual SCM must be sized to treat the WQv associated with its entire contributing drainage area. Exceptions to this may be granted by the City Engineer and/or the OEPA on a case-by-case basis.

D. Stormwater quality management practices shall be designed such that the drain time is long enough to provide treatment and protect against downstream bank erosion, but short enough to provide storage available for successive rainfall events as defined in Table 2.

E. Sites within watersheds of coldwater habitat streams shall include SCMs to infiltrate the water quality volume or reduce the temperature of discharged runoff. SCMs that reduce the temperature of discharged runoff include bioretention, permeable pavement, underground detention, and incorporation of shading and infiltration in parking lot design.

F. Each practice shall be designed to facilitate sediment removal, vegetation management, debris control, and other maintenance activities defined in the Inspection Plan and Maintenance Agreement for the site.

Table 2: Draw Down Times for Stormwater Control Measures

Stormwater Control Measure	Drain Time of WQv
Infiltration Basin or Trench 1	48 hours
Permeable Pavement - Infiltration 1	48 hours
Permeable Pavement - Extended Detention	24 hours
Extended Detention Facilities	
Dry Extended Detention Basin 2	48 hours
Wet Extended Detention Basin 3	24 hours
Construction Wetlands (above permanent pool) 4	24 hours
Bioretention Area/Cell 5, 6	24 hours
Sand and Other Media Filtration 5	24 hours

Pocket Wetland 7	24 hours
<p>1 Practices designed to fully infiltrate the WQv shall empty within 48 hours to provide storage for subsequent storm events.</p> <p>2 The use of a forebay and micropool is required on all dry extended detention basins. Each is to be sized at a minimum 10% of the WQv.</p> <p>3 Provide both a permanent pool and an extended detention volume above the permanent pool, each sized with at least 0.75*WQV .</p> <p>4 Extended detention shall be provided for the WQv above the permanent water pool.</p> <p>5 The surface ponding area shall completely empty within 24 hours so that there is no standing water. Shorter drawdown times are acceptable as long as design criteria in Rainwater and Land Development have been met.</p> <p>6 This includes grassed linear bioretention, which was previously titled enhanced water quality swale.</p> <p>7 Pocket wetlands must have a wet pool equal to the WQv, with 25% of the WQv in a pool and 75% in marshes. The EDv above the permanent pool must be equal to the WQv.</p>	

(3) Additional criteria applying to infiltration facilities.

A. Infiltration facilities should be designed to meet all criteria in Rainwater and Land Development.

B. All runoff directed into an infiltration basin must first flow through a pretreatment practice such as a grass channel or filter strip to remove coarser sediments that could cause a loss of infiltration capacity.

C. During construction, all runoff from disturbed areas of the site shall be diverted away from the proposed infiltration basin site. No construction equipment shall be allowed within the infiltration basin site to avoid soil compaction.

(4) Additional criteria for extended detention facilities:

A. The outlet shall be designed to not release more than the first half of the water quality volume in less than 1/3rd of the drain time. The outlet shall be designed to minimize clogging, vandalism, maintenance, and promote the capture of floatable pollutants.

B. The basin design shall incorporate the following features to maximize multiple uses, aesthetics, safety, and maintainability:

1. Basin side slopes above the permanent pool shall have a run to rise ratio or 4:1 or flatter.

2. The perimeter of all permanent pool areas deeper than 4 feet shall be surrounded by an aquatic bench that extends at least 8 feet and no more than 15 feet outward from the normal water edge. The 8 feet wide portion of the aquatic bench closest to the shoreline shall have an average depth of 6 inches below the permanent pool to promote the growth of aquatic vegetation. The remainder of the aquatic bench shall be no more than 15 inches below the permanent pool to minimize drowning risk to individuals who accidentally or intentionally enter the basin, and to limit growth of dense vegetation in a manner that allows waves and mosquito predators to pass through the vegetation. The maximum slope of the aquatic bench shall be 10 (H) to 1 (V). The aquatic bench shall be planted with native plant species comparable to wetland vegetation that are able to withstand prolonged inundation. The use of invasive plant species is prohibited.

3. A forebay designed to allow larger sediment particles to settle shall be placed at basin inlets. The forebay and micropool volume shall be equal to approximately 10% of the water quality volume (WQv).

4. Detention basins shall be provided with an emergency drain, where practicable, so that the basin may be emptied if the primary outlet becomes clogged and/or to drain the permanent pool to facilitate maintenance. The emergency drain should be designed to drain by gravity where possible.

(5) Criteria for the Acceptance of Alternative post-construction SCMs: The applicant may request approval from the City Engineer for the use of alternative structural post-construction SCMS if the applicant shows to the satisfaction of the City Engineer that these SCMs are equivalent in pollutant removal and runoff flow/volume reduction effectiveness to those listed in Table 2. If the site is greater than five (5) acres, or less than five (5) acres but part of a larger common plan of development or sale which will disturb five (5) or more acres, prior approval from the Ohio EPA is necessary. To demonstrate the equivalency, the applicant must show:

A. The alternative SCM has a minimum total suspended solid (TSS) removal efficiency of 80 percent, using the Level II Technology Acceptance Reciprocity Partnership (TARP) testing protocol.

B. The water quality volume discharge rate from the selected SCM is reduced to prevent stream bed erosion, unless there will be negligible hydrologic impact to the receiving surface water of the State. The discharge rate from the SCM will have negligible impacts if the applicant can demonstrate one of the following conditions:

1. The entire water quality volume is recharged to groundwater.
2. The development will create less than one acre of impervious surface.
3. The development project is a redevelopment project with an ultra-urban setting, such as a downtown area, or on a site where 100 percent of the project area is already impervious surface and the stormwater discharge is directed into an existing storm sewer system.
4. The stormwater drainage system of the development discharges directly into a large river of fourth order or greater or to a lake, and where the development area is less than 5 percent of the water area upstream of the development site, unless a TMDL has identified water quality problems in the receiving surface water of the State.

(d) Stormwater Quantity Control: The Comprehensive Stormwater Management Plan shall describe how the proposed SCMs are designed to meet the following requirements for stormwater quantity control for each watershed in the development:

(1) The peak discharge rate of runoff from the Critical Storm and all more frequent storms occurring under post-development conditions shall not exceed the peak discharge rate of runoff from a 1-year, 24-hour storm occurring on the same development drainage area under pre-development conditions.

(2) Storms of less frequent occurrence (longer return periods) than the Critical Storm, up to the 100-year, 24-hour storm shall have peak runoff discharge rates no greater than the peak runoff rates from equivalent size storms under pre-development conditions. The 1, 2, 5, 10, 25, 50, and 100-year storms shall be considered in designing a facility to meet this requirement.

(3) The Critical Storm for each specific development drainage area shall be determined as follows:

A. Determine, using a curve number-based hydrologic method or other hydrologic method approved by the City Engineer, the total volume (acre-feet) of runoff from a 1-year, 24-hour storm occurring on the development drainage area before and after development. These calculations shall meet the following standards:

1. Calculations shall include the lot coverage assumptions used for full build out as proposed.
2. Calculations shall be based on the entire contributing watershed to the development area.
3. Model pervious, directly connected impervious and disconnected impervious areas as separate subwatersheds.
4. Drainage area maps shall include area, curve number, time of concentrations. Time of concentration shall also show the flow path and the separation in flow type.
5. Rainfall Depth - For the most accurate, up-to-date, location-specific rainfall data for stormwater design, use the Precipitation-Frequency Atlas of the United States, NOAA Atlas 14, Vol 2(3) [available online: <http://hdsc.nws.noaa.gov/hdsc/pfds/>]
6. Temporal Distribution - Use the SCS Type II rainfall distribution for all design events with a recurrence interval greater than 1 year. Include lot coverage assumptions used for full build out of the proposed condition.
7. Curve numbers for the pre-development condition shall reflect the average type of land use prior to any development and not only the current land use.

a. Pre-development Curve Numbers - for wooded or brushy areas, use listed values from TR-55 NRCS USDA Urban Hydrology for Small Watersheds, 1986 in good hydrologic condition. For meadows, use listed values. For all other areas (including all types of agriculture), use pasture, grassland, or range in good hydrologic condition.

b. Post-development Curve Numbers - Open space areas shall use post-construction HSGs from Rainwater and Land Development unless the soil is amended after development according to the following protocol: till the subsoil to 15-18 inches, then till using a chisel, spade, or rotary tillage and incorporate compost through top 12 inches, replace topsoil to a minimum depth of 4 inches. All undisturbed areas or open space with amended soils shall be treated as "open space in good condition."

8. Time of Concentration - Use velocity based methods from (TR-55 NRCS USDA Urban Hydrology in Small Watersheds, 1986) to estimate travel time (T_t) for overland (sheet) flow, shallow concentrated flow and channel flow.

- a. Maximum sheet flow length is 100 ft.
 - b. Use the appropriate "unpaved" velocity equation for shallow concentrated flow from Soil Conservation Service National Engineer Handbook Section 4 - Hydrology, (NEH-4).
9. The volume reduction provided by permeable pavement, bioretention, or other LID SCMs may be subtracted from the post development stormwater volume. Volume reductions for these practices may be demonstrated using methods outlined in Rainwater and Land Development or a hydrologic model acceptable to the City Engineer.

B. To account for future post-construction improvements to the site, calculations shall assume an impervious surface such as asphalt or concrete for all parking areas and driveways, regardless of the surface proposed in the site description except in instances of engineered permeable pavement systems. From the volume determined in Section [1367.09\(D\)\(3\)\(a\)](#), determine the percent increase in volume of runoff due to development. Using the percentage, select the 24-hour Critical Storm from Table 3:

Table 3: 24-Hour Critical Storm

If the Percentage of Increase in Volume of Runoff is:		The Critical Storm will be:
Equal to or Greater Than:	and Less Than;	
---	10	1 year
10	20	2 year
20	50	5 year
50	100	10 year
100	250	25 year
250	500	50 year
500	---	100 year

For example, if the percent increase between the pre- and post-development runoff volume for a 1-year storm is 35%, the Critical Storm is a 5-year storm. The peak discharge rate of runoff for all storms up to this frequency shall be controlled so as not to exceed the peak discharge rate from the 1-year frequency storm under pre-development conditions in the development drainage area. The post-development runoff from all less frequent storms need only be controlled to meet pre-development peak discharge rates for each of those same storms.

- (e) Stormwater Management on Redevelopment Projects.
 - (1) Comprehensive Stormwater Mangement Plans for redevelopment projects must accomplish one of the following options:
 - A. Reduce existing site impervious areas by at least 25 percent, a one-for-one credit towards the 25 percent net reduction of impervious area can be obtained through the use of greenroofs.
 - B. Infiltrate at least 25 percent of the WQv
 - C. Capture, treat and release 50 percent of the WQv.
 - (2) When a combination of impervious area reduction and stormwater quality control facilities are used, ensure a 25-percent net reduction of the site impervious area, provide for treatment of at least 50 percent of the WQv, or a combination of the two.
 - (3) Where projects are a combination of new development and redevelopment, the total water quality volume required to be treated shall be calculated by a weighted average based on acreage, with the new development at 100 percent water quality volume and redevelopment at 25 percent infiltration of the WQv, or 50% treatment of the WQv.
 - (4) Where conditions prevent impervious area reduction or on-site stormwater management for redevelopment projects, practical alternatives as detailed in Section [1367.10](#) may be approved by the City Engineer.

(Ord. 2016-18. Passed 5-26-16.)

1367.10 ALTERNATIVE ACTIONS.

- (a) When the City of Willoughby Hills determines that site constraints compromise the intent of this regulation, off-site alternatives may be used that result in an improvement of water quality and a reduction of stormwater quantity. Such alternatives shall meet the following standards:

- (1) Shall achieve the same level of storm water quantity and quality control that would be achieved by the on-site controls required under this regulation.
 - (2) Implemented in the Hydrologic Unit Code (HUC) 12 watershed unit as the proposed development project.
 - (3) The mitigation ratio of the water quality volume is 1.5 to 1 or the water quality volume at the point of retrofit, whichever is greater.
 - (4) An inspection and maintenance agreement as described in Chapter [1367.08.D.10](#) is established to ensure operations and treatment in perpetuity.
 - (5) Obtain prior written approval from Ohio EPA.
 - (b) Alternative actions may include, but are not limited to the following. All alternative actions shall be approved by the City Engineer:
 - (1) Fees, in an amount specified by the City of Willoughby Hills to be applied to community-wide SCMs.
 - (2) Implementation of off-site SCMs and/or the retrofit of an existing practice to increase quality and quantity control.
 - (3) Stream, floodplain, or wetland restoration.
 - (4) Acquisition or conservation easements on protected open space significantly contributing to stormwater control such as wetland complexes.
- (Ord. 2016-18. Passed 5-26-16.)

1367.11 EASEMENTS.

Access to SCMs as required by the City Engineer for inspections and maintenance shall be secured by easements. The following conditions shall apply to all easements:

- (a) Easements shall be included in the Inspection and Maintenance Agreement submitted with the Comprehensive Storm Water Management Plan.
 - (b) Easements shall be approved by the City of Willoughby Hills prior to approval of a final plat and shall be recorded with the Lake County Auditor and on all property deeds.
 - (c) Unless otherwise required by the City Engineer, access easements between a public right-of-way and all SCMs shall be no less than 25-feet wide. The easement shall also incorporate the entire practice plus an additional 25-foot wide band around the perimeter of the SCM.
 - (d) The easement shall be graded and/or stabilized as necessary to allow maintenance equipment to access and manipulate around and within each facility, as defined in the Inspection and Maintenance Agreement for the site.
 - (e) Easements to structural SCMs shall be restricted against the construction therein of buildings, fences, walls, and other structures that may obstruct the free flow of stormwater and the passage of inspectors and maintenance equipment; and against the changing of final grade from that described by the final grading plan approved by the City of Willoughby Hills. Any re-grading and/or obstruction placed within a maintenance easement may be removed by the City of Willoughby Hills at the property owners' expense.
- (Ord. 2016-18. Passed 5-26-16.)

1367.12 MAINTENANCE AND FINAL INSPECTION APPROVAL.

To receive final inspection and acceptance of any project, or portion thereof, the following must be completed by the applicant and provided to the City Engineer:

- (a) Final stabilization must be achieved and all permanent SCMs must be installed and made functional, as determined by the City Engineer and per the approved Comprehensive Storm Water Management Plan.
- (b) An As-Built Certification, including As-Built Survey and Inspection, must be sealed, signed and dated by a Professional Engineer and a Professional Surveyor with a statement certifying that the stormwater control measures, as designed and installed, meet the requirements of the Comprehensive Storm Water Management Plan approved by the City Engineer. In evaluating this certification, the City Engineer may require the submission of a new set of stormwater practice calculations if he/she determines that the design was altered significantly from the approved Comprehensive Storm Water Management Plan. The As-Built Survey must provide the location, dimensions, and bearing of such practices and include the entity responsible for long-term maintenance as detailed in the Inspection and Maintenance Agreement.
- (c) A copy of the complete and recorded Inspection and Maintenance Plan and Maintenance Agreement as specified in Section [1367.08](#) must be provided to the City Engineer. (Ord. 2016-18. Passed 5-26-16.)

1367.13 ON-GOING INSPECTIONS.

The owner shall inspect SCMs regularly as described in the Inspection and Maintenance Plan and Inspection and Maintenance Agreement. The City of Willoughby Hills has the authority to enter upon the property to conduct inspections as necessary, with prior notification of the property owner, to verify that the SCMs are being maintained and operated in accordance with this regulation. Upon finding a malfunction or other need for maintenance or repair, the City of Willoughby Hills shall provide written notification to the responsible party, as detailed in the Inspection and Maintenance Agreement, of the need for maintenance. Upon notification, the responsible party shall have five (5) working days, or other mutually agreed upon time, to make repairs or submit a plan with detailed action items and established timelines. Should repairs not be made within this time, or a plan approved by the City Engineer for these repairs not in place, the City of Willoughby Hills may undertake the necessary repairs and assess the responsible party. (Ord. 2016-18. Passed 5-26-16.)

1367.14 FEES.

The Comprehensive Storm Water Management Plan review, filing, and inspection fee is part of a complete submittal and is required to be submitted to the City of Willoughby Hills before the review process begins. The City Engineer shall establish a fee schedule based upon the actual estimated cost for providing these services.

(Ord. 2016-18. Passed 5-26-16.)

1367.15 BOND.

(a) If a Comprehensive Stormwater Management Plan is required by this regulation, soil-disturbing activities shall not be permitted until a cash bond of 5% of the total project cost, has been deposited with the City of Willoughby Hills Finance Department. This bond shall be posted for the City of Willoughby Hills to perform the obligations otherwise to be performed by the owner of the development area as stated in this regulation and to allow all work to be performed as needed in the event that the applicant fails to comply with the provisions of this regulation. The stormwater bond will be returned, less City of Willoughby Hills' administrative fees as detailed in the City of Willoughby Hills Codified Ordinances, when the following three criteria are met:

(1) After 80% of the lots of the project have been complete or 100% of the total project has been permanently stabilized or three (3) years from the time of permanent stabilization have passed.

(2) An "As Built Inspection" of all stormwater control measures as described in [1367.12](#) is approved by the City Engineer.

(3) An Inspection and Maintenance Plan has been approved by the City of Willoughby Hills and Inspection and Maintenance Agreement has been signed by the developer, the contractor, the City of Willoughby Hills, and the private owner or homeowners association who will take long term responsibility for these SCMs, is accepted by the City Engineer.

(b) Once these criteria are met, the applicant shall be reimbursed all bond monies that were not used for any part of the project. If all of these criteria are not met after three years of permanent stabilization of the site, the City of Willoughby Hills may use the bond monies to fix any outstanding issues with all stormwater management structures on the site and the remainder of the bond shall be given to the private lot owner/homeowners association for the purpose of long term maintenance of the project. (Ord. 2016-18. Passed 5-26-16.)

1367.16 INSTALLATION OF WATER QUALITY STORMWATER CONTROL MEASURES.

The applicant may not direct runoff through any water quality structures or portions thereof that would be degraded by construction site sediment until the entire area tributary to the structure has reached final stabilization as determined by the City Engineer. This occurs after the completion of the final grade at the site, after all of the utilities are installed, and the site is subsequently stabilized with vegetation or other appropriate methods. The developer must provide documentation acceptable to the City Engineer to demonstrate that the site is completely stabilized. Upon this proof of compliance, the water quality structure(s) may be completed and placed into service. Upon completion of installation of these practices, all disturbed areas and/or exposed soils caused by the installation of these practices must be stabilized within 2 days.

(Ord. 2016-18. Passed 5-26-16.)

1367.17 VIOLATIONS.

No person shall violate or cause or knowingly permit to be violated any of the provisions of this regulation, or fail to comply with any of such provisions or with any lawful requirements of any public authority made pursuant to this regulation, or knowingly use or cause or permit the use of any lands in violation of this regulation or in violation of any permit granted under this regulation.

(Ord. 2016-18. Passed 5-26-16.)

1367.18 APPEALS.

Any person aggrieved by any order, requirement, determination, or any other action or inaction by the City of Willoughby Hills in relation to this regulation may appeal this matter pursuant to Chapter [1117](#) of the Codified Ordinances of the City of Willoughby Hills.

(Ord. 2016-18. Passed 5-26-16.)

1367.99 PENALTY.

(a) Any person, firm, entity or corporation; including but not limited to, the owner of the property, his agents and assigns, occupant, property manager, and any contractor or subcontractor who violates or fails to comply with any provision of this regulation is guilty of a misdemeanor of the third degree and shall be fined no more than five hundred dollars (\$500.00) or imprisoned for no more than sixty (60) days, or both, for each offense. A separate offense shall be deemed committed each day during or on which a violation or noncompliance occurs or continues.

(b) The imposition of any other penalties provided herein shall not preclude the City of Willoughby Hills instituting an appropriate action or proceeding in a Court of proper jurisdiction to prevent an unlawful development, or to restrain, correct, or abate a violation, or to require compliance with the provisions of this regulation or other applicable laws, ordinances, rules, or regulations, or the orders of the City of Willoughby Hills.

(Ord. 2016-18. Passed 5-26-16.)